

## CLAIMS

What is claimed is:

- 5        1. A gripper and catheter system for treating a patient comprising:  
a catheter shaft having a proximal end and a distal end; the shaft defining a longitudinal  
axis;  
a hub affixed to the catheter shaft near its proximal end; the hub providing a handle for  
manipulating the catheter shaft, the hub having a larger size than an outer radial  
10      dimension of the catheter shaft;  
a tubular gripper surrounding a portion of the catheter shaft, the gripper defining inner  
and outer surfaces; the gripper outer surface having a plurality of outwardly  
protruding ridges extending transversely in a ring around the outer surface of the  
gripper;  
15      wherein the gripper is movable from an initial position to a desired position, at least a  
portion of the gripper being flexible so that it can be temporarily squeezed to  
cause at least a portion of the gripper inner surface to contact a portion of an outer  
surface of the catheter shaft to that the gripper can transmit frictional forces to the  
catheter shaft;  
20      when the squeezing pressure is released, the gripper tends to resiliently return to its  
original shape; such that the gripper may be moved to a second desired position  
on the catheter shaft.

2. The gripper and catheter system of Claim 1, wherein the gripper is made of a polymer material.
3. The gripper and catheter system of Claim 1, wherein the catheter further comprises a balloon affixed to the catheter shaft near its distal end.  
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4. The gripper and catheter system of Claim 1, wherein the gripper in an initial position contacts a portion of the hub.
- 10 5. The gripper and catheter system of Claim 1, wherein a feature affixed to the hub in an initial position has a releasable interference fit with the gripper, which tends to releasably hold the gripper in the initial position.
- 15 6. The gripper and catheter system of Claim 1, wherein the catheter further comprises a balloon affixed to the catheter shaft, and the catheter shaft defines an inflation lumen connecting an inflation port defined by the hub to an interior of the balloon, and the catheter shaft defines a guidewire lumen connecting a distal guidewire port distal of the balloon and a proximal guidewire port positioned between the balloon and the hub, in a rapid-exchange configuration.
- 20 7. The gripper and catheter system of Claim 1, wherein the catheter shaft has a lubricious coating.

8. The gripper and catheter system of Claim 1, wherein the gripper is releasably locked  
in an initial position by a snap-fit with the hub.
- 5                   9. The gripper and catheter system of Claim 1, wherein the hub and gripper have  
complementary screw threads, such that the gripper can be releasably held in an  
initial position.
- 10                 10. The gripper and catheter system of Claim 1, further comprising a strain relief tube  
affixed to the hub and catheter shaft, the gripper in an initial position surrounding  
at least a portion of the strain relief tube.
- 15                 11. The gripper and catheter system of Claim 10, wherein the strain relief tube comprises  
a protruding ring, and the gripper has a corresponding inner indented ring.
- 16                 12. The gripper and catheter system of Claim 1, wherein the gripper is made of a material  
with a high coefficient of friction.
- 17                 13. The gripper and catheter system of Claim 1, wherein an initial gap is defined between  
an outer dimension of the catheter shaft and an inner dimension of the gripper.
- 20                 14. The gripper and catheter system of Claim 1, wherein an outer dimension of the  
catheter shaft is approximately 2 millimeters or less.

15. The gripper and catheter system of Claim 1, wherein the gripper is made of a material selected from the group: rubber, polyurethane silicone rubber, and PEBA.

16. The gripper and catheter system of Claim 1, wherein the gripper inner surface is  
5 textured to enhance frictional contact with the catheter shaft.

17. A gripper and catheter system for treating a patient comprising:  
a catheter shaft having a proximal end and a distal end; the shaft defining a longitudinal  
axis;

10 a hub affixed to the catheter shaft near its proximal end; the hub providing a handle for manipulating the catheter shaft, the hub having a larger size than an outer radial dimension of the catheter shaft;  
a tubular gripper surrounding a portion of the catheter shaft, the gripper defining inner and outer surfaces;

15 wherein the gripper is movable from an initial position to a desired position, at least a portion of the gripper being flexible so that it can be temporarily squeezed to cause at least a portion of the gripper inner surface to contact a portion of an outer surface of the catheter shaft to that the gripper can transmit frictional forces to the catheter shaft;

20 when the squeezing pressure is released, the gripper tends to resiliently return to its original shape; such that the gripper may be moved to a second desired position on the catheter shaft;

wherein the gripper is initially affixed to the hub and the physician must initially break an attachment to move the gripper to the first desired gripping position.

18. A gripper and catheter system for treating a patient comprising:  
5      a catheter shaft having a proximal end and a distal end; the shaft defining a longitudinal axis;  
a hub affixed to the catheter shaft near its proximal end; the hub providing a handle for manipulating the catheter shaft, the hub having a larger size than an outer radial dimension of the catheter shaft;  
10     a tubular gripper surrounding a portion of the catheter shaft, the gripper defining inner and outer surfaces;  
wherein the gripper is movable from an initial position to a desired position, at least a portion of the gripper being flexible so that it can be temporarily squeezed to cause at least a portion of the gripper inner surface to contact a portion of an outer surface of the catheter shaft to that the gripper can transmit frictional forces to the catheter shaft;  
15     when the squeezing pressure is released, the gripper tends to resiliently return to its original shape; such that the gripper may be moved to a second desired position on the catheter shaft;  
20     wherein the gripper is made of more than one layer of different materials.

19. A gripper and catheter system for treating a patient comprising:

a catheter shaft having a proximal end and a distal end; the shaft defining a longitudinal axis;

a hub affixed to the catheter shaft near its proximal end; the hub providing a handle for manipulating the catheter shaft, the hub having a larger size than an outer radial dimension of the catheter shaft;

5 a tubular gripper surrounding a portion of the catheter shaft, the gripper defining inner and outer surfaces; the gripper having one or more slits formed in the gripper, so that it can be positioned around or removed from the catheter shaft;

wherein the gripper is movable from an initial position to a desired position, at least a portion of the gripper being flexible so that it can be temporarily squeezed to cause at least a portion of the gripper inner surface to contact a portion of an outer surface of the catheter shaft to that the gripper can transmit frictional forces to the catheter shaft;

10 when the squeezing pressure is released, the gripper tends to resiliently return to its original shape; such that the gripper may be moved to a second desired position on the catheter shaft.

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